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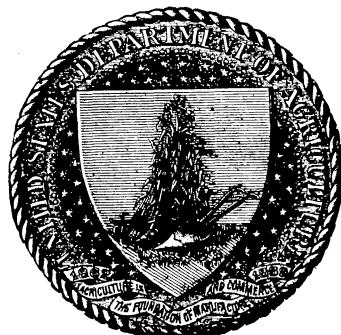
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SOME

# ESSENTIALS IN BEEF PRODUCTION.

BY

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## LETTER OF TRANSMITTAL.

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U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY,  
Washington, D. C., March 15, 1898.

SIR: I have the honor to transmit herewith for publication as a Farmers' Bulletin an article on Some Essentials in Beef Production, submitted by the author, Professor Curtiss, in accordance with your instructions.

Respectfully,

D. E. SALMON,  
*Chief.*

Hon. JAMES WILSON, *Secretary.*

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## SOME ESSENTIALS IN BEEF PRODUCTION.

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A brief consideration of the qualities of practical excellence in beef cattle may well engage the attention of the breeder and feeder. A topic of this character is too often regarded as of interest only to the professional exhibitor or the lecture-room instructor and student. But every successful breeder must always be a student, for the first essential in successful breeding is a clear conception of what constitutes a good animal and of all the characteristics that go to make up real excellence in a herd. It is said that the late renowned Amos Cruickshank, the founder of the great Scotch tribe of Shorthorns, was often seen by the side of the leading sale rings of Great Britain intently studying every animal that came into the ring, and his minute knowledge of all the animals shown was the marvel of those who chanced to converse with him about them afterwards. While the methods of the justly celebrated Robert Bakewell, the first great improver of live stock, were largely secret, it is known that he was not only an exceedingly close student of living forms, but that his rooms were also full of models and parts of domestic animals that he had carefully dissected and preserved for future reference. In his work of selection and improvement he imparted to the Leicester sheep such a remarkable aptitude to take on flesh that this quality remains, even to the present day, a characteristic of the breed to a greater degree than of any other long-wooled breeds of England.

This aptitude to take on flesh is of vital importance to the beef producer as well as the breeder of show-ring and sale stock. The show-ring type must necessarily keep close to and be largely governed by the practical demands imposed by the feed yard and the block, else the lessons of the show yard and sale ring are without value, if not positively misleading. No one is more concerned in what constitutes the essential qualities of a good beef animal than the man who breeds and feeds for the block and attempts to meet the conditions imposed by the market; for it must be kept in mind that this is the ultimate end of all beef stock, and the best beef animal is the one that carries to the block the highest excellence and the most profit. This, in a word, is the keynote of the whole problem.

### THE BEEF TYPE.

There is at the outset a well-defined beef type that admits of less flexibility than is generally supposed. We hear much about the dairy

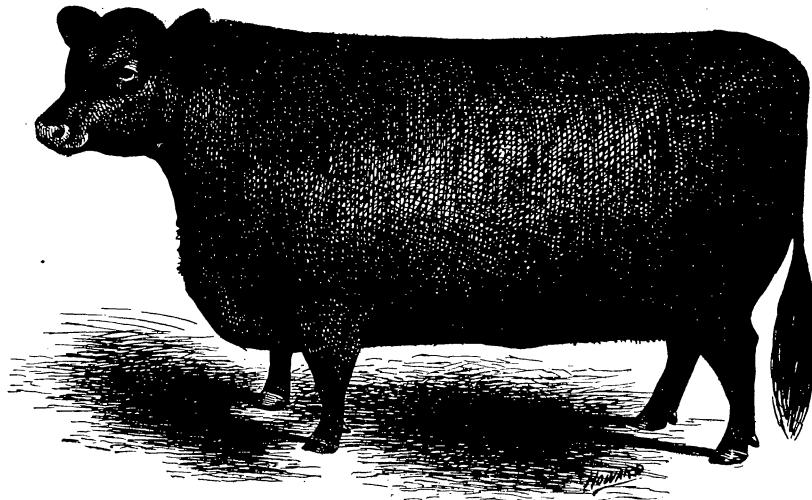


FIG. 1.—Champion Angus heifer, Smithfield (England) Fat Stock Show.

type—and there is a dairy type, fairly clean cut and well defined—but there is also a beef type, more clearly defined and less variable than

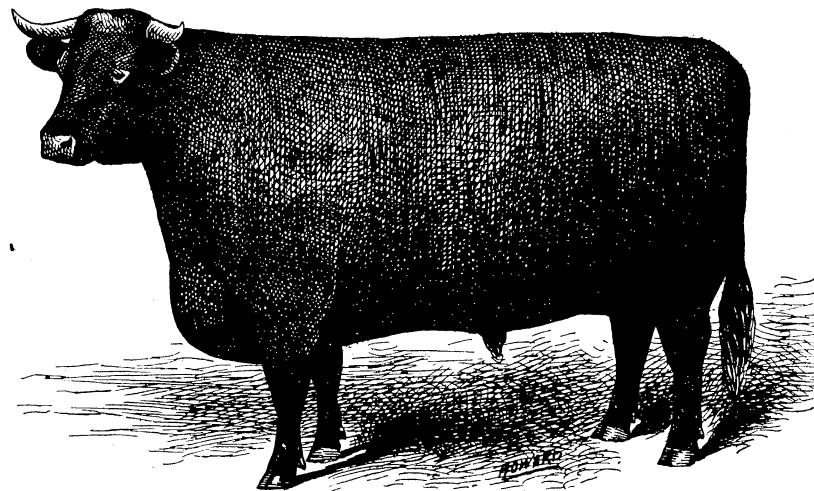


FIG. 2.—High-grade Shorthorn steer.

the dairy type. Common observation and experience confirm this assertion. There are not a few cows of quite positive beef tendencies capa-

ble of making very creditable dairy records, and a great many that combine milk and beef to a profitable degree, but a good carcass of beef from a steer of a pronounced dairy type or breed is rarely seen. So clearly and definitely is this beef type established that to depart from it means to sacrifice beef excellence.

The accompanying illustrations (figs. 1, 2, and 3) pretty accurately represent the ideal beef type.

The first is a good reproduction from a photograph of a prize-winning Angus heifer exhibited by Queen Victoria at one of the late Smithfield fat-stock shows. The next is a portrait of a high-grade Shorthorn steer, raised as a skim-milk calf at the Iowa Experiment Station. He was the best steer in the Chicago yards on a day when there were

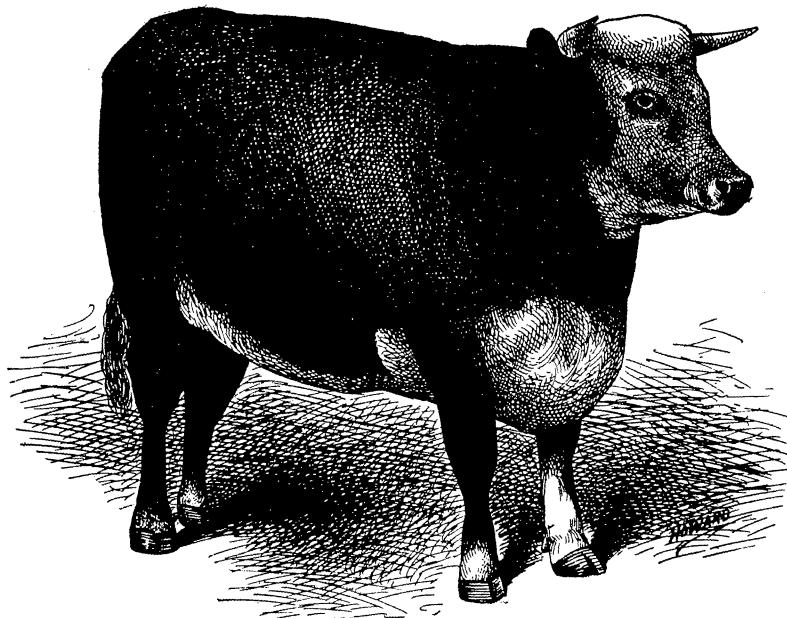


FIG. 3.—High-grade Hereford steer.

26,000 cattle on the market. The third is of a high-grade Hereford steer, fed at the Iowa Experiment Station, that was good enough to easily top the market, and was one of a carload to dress an average of 67.5 per cent of net beef. He weighed 1,620 pounds when 2 years old.

These animals, though representing different breeds, present that compactness of form, thickness, and substance, together with superior finish and quality, coupled with an inherent aptitude to lay on flesh thickly and evenly, that always characterizes the beef animal of outstanding merit.

These points are more specifically itemized in the following score card prepared for the use of students at the Iowa Agricultural College:

## Scale of points.

	Possible score.
<b>A. GENERAL APPEARANCE (25):</b>	
Weight—Estimated ..... lbs.; actual.....	10
Form and size, smooth, even, parallel lines, deep, broad, low set .....	10
Quality, thick covering of firm flesh, mellow touch, soft heavy coat, fine bone, velvet-like skin.....	10
Style, vigorous, strong character, active, but not restless.....	5
*Objections, rough or angular in form, harsh coat, hard skin, dull appearance.	
<b>B. HEAD AND NECK (10):</b>	
Muzzle, broad; mouth large, jaws strong, nostrils large.....	2
Eyes, large, clear, placid .....	2
Face, short; quiet expression.....	1
Forehead, broad, full .....	1
Ears, medium size, fine texture.....	2
Neck, thick, short and full, throat clean .....	2
Horns, fine texture, medium size or small.....	
* Objections, long or lean head and neck, dull eyes, coarse, heavy horns ..	
<b>C. FOREQUARTERS (10):</b>	
Shoulder, covered with flesh, compact on top, smooth .....	4
Brisket, prominent and wide .....	3
Dewlap, full, skin not too loose and drooping .....	1
Legs, straight, short; arm full, shank fine, smooth .....	2
* Objections, bare shoulders, narrow on top, contracted brisket, coarse legs.	
<b>D. BODY (35):</b>	
Chest, full, deep, wide; girth large; crops full .....	8
Ribs, long, arched, well covered with firm flesh.....	7
Back, broad, straight, smooth, and even .....	10
Loin, thick, broad, full .....	6
Flank, full, even with underline, or nearly so .....	4
* Objections, narrow or sunken chest, hollow crops, sloping ribs, bare or rough back and loin, high flank .....	
<b>E. HINDQUARTERS (20):</b>	
Hips, wide, smooth, well covered .....	5
Rump, long, even, wide, smooth, not patchy .....	4
Pin bones, wide apart, smooth, not patchy .....	2
Thighs, full, deep, and wide .....	2
Twist, full, deep, large, level with flank, or nearly so .....	3
Purse, full, indicating fleshiness .....	2
Legs, straight, short, shank fine, smooth .....	2
* Objections, prominent rough hips, narrow or bare rump, spare thighs, light twist, small purse, coarse legs .....	
<b>Total .....</b>	<b>100</b>

## THE USE OF THE SCORE CARD.

The score card is an educator and of great advantage to the student, but its use is not generally favored in the show ring by leading judges. The judge who goes into the show ring, like the expert buyer in the great markets, should carry a well-defined mental conception of a good animal

\* The score card as used in the classes contained an additional column for marking the student's estimate of deficient points.

and be able to detect at once the qualities that are objectionable. This applied to the animals of a ring virtually amounts to the use of a score card without the objectionable features of that system. In recommending the score card to the student, the term student is used in its broadest sense, embracing not only the prospective breeder within the class room, but every member of the great practical school as well who wishes to keep in the foremost rank of his profession. One of the prime causes why so many men fail in this field is the lack of a thorough study of the essential characteristics. In other words, and to put it more plainly, breeders fail to breed good animals because they do not know what

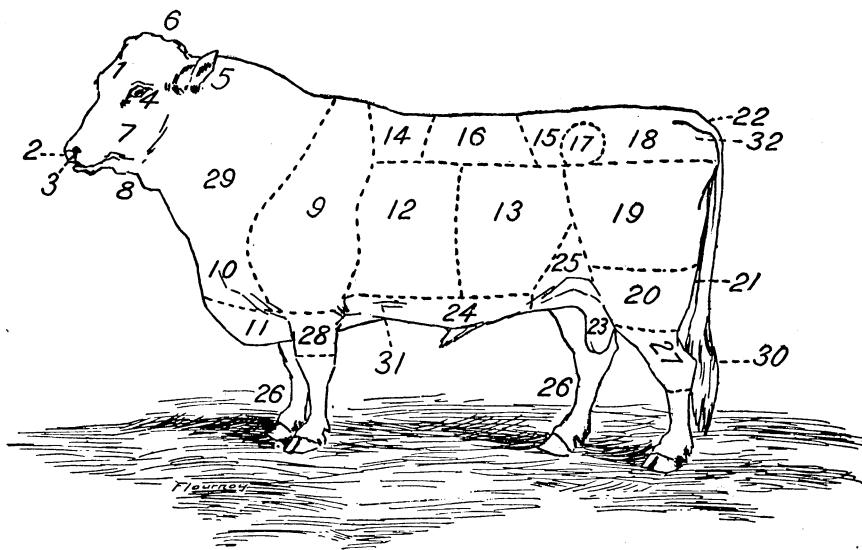


FIG. 4.—Names of points.

1. Forehead and face.	9. Shoulders.	17. Hooks.	25. Flanks.
2. Muzzle.	10. Chest.	18. Rumps.	26. Legs and bone.
3. Nostrils.	11. Brisket.	19. Hindquarters.	27. Hocks.
4. Eyes.	12. Fore ribs.	20. Thighs.	28. Forearms.
5. Ears.	13. Back ribs.	21. Twist.	29. Neck vein.
6. Poll.	14. Crops.	22. Base of tail.	30. Bush of tail.
7. Jaws.	15. Loin.	23. Cod purse.	31. Heart girth.
8. Throat.	16. Back.	24. Underline.	32. Pin bones.

good animals are. A clear and accurate understanding of what constitutes genuine excellence is absolutely essential to the attainment of that excellence.

It is not necessary here to take up in detail all the points enumerated in the foregoing score card, but it is proper to discuss briefly the controlling principles and logical reasons that govern the formation of a standard of excellence of this nature. The analytical method of resolving every problem into scientific formulas and principles, based on the firm foundation of unquestionable truth, is the intelligent method of study and investigation, and this method ought more generally to prevail in agriculture.

## BEEF CHARACTERISTICS BRIEFLY DEFINED.

The first thing that should be looked to is the general beef form—low, broad, deep, smooth, and even, with parallel lines. No wedge shape or sharp protruding spinal column is wanted for the block. Next in importance is a thick even covering of the right kind of meat in the parts that give high-priced cuts. This is a very important factor in beef cattle that is often overlooked. The accompanying illustration

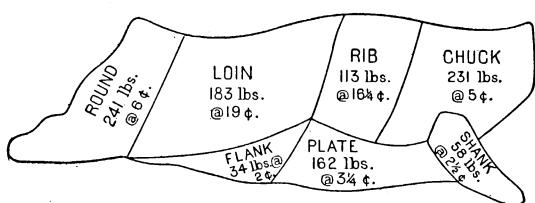


FIG. 5.—Chicago wholesale dealers' method of cutting beef.

horns, 2 Angus, and 2 Herefords—fed and marketed by the Iowa Experiment Station, the cuts designated as "rib" and "loin" averaged 27.8 per cent of the aggregate weight of the carcass and sold for 63.9 per cent of the total value. By this method the chuck, or shoulder, and rib cuts are divided between the fifth and sixth ribs, and in doing so the knife is run close up to the shoulder blade. The rib and loin cuts are divided between the twelfth and thirteenth ribs, and the loin is separated from the "round" at the point of the hip. In cutting for the retail trade the "rib roast" is taken from the cut designated "rib" and the "porterhouse" and "sirloin" cuts are taken from the loin cut. Tenderloin steak is taken from the inside and just beneath the ribs on either side of the spinal column, and the commercial beef tenderloin always comes from inferior stock, mainly from "canners." That class of cattle has no other meat

that is desirable for the block, and the tenderloin strips may be pulled out and put on the market, while the remainder goes into the boiling vats for canned or pressed beef. To take tenderloin steak from good carcasses would destroy the value of the "porterhouse" cuts. This the dealer never does. The other retail cuts and their relative values are shown in the second diagram (fig. 6). The third illustration (fig. 7) represents the retail method of English butchers.

The Chicago and New York markets discriminate more sharply and

(fig. 5) represents the wholesale method of cutting beef, showing the relative importance and value of the different parts. In a test made in Chicago on 6 representative beef animals—2 Short-

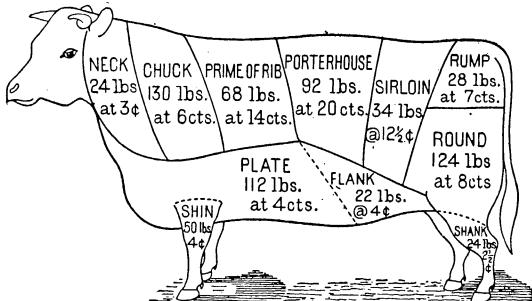


FIG. 6.—Chicago retail dealers' method of cutting beef.

present a wider variation in the relative price of the prime and coarser cuts than any other markets of the world. By reference to the wholesale method of cutting beef used by Swift & Co., and the actual wholesale selling prices of the several cuts taken from a bunch of cattle sold this firm by the Iowa Experiment Station, it will be seen that the rib and loin cuts command over four times the average price paid for the remainder of the carcass, and it is apparent that the practical beef animal must be good in these parts. Broad, well-covered backs and ribs are absolutely necessary to a good carcass of beef, and no other excellencies, however great, will compensate for the lack of this essential. It is necessary to both breed and feed for thickness in these parts. And mere thickness and substance here are not all. Animals that are soft and patchy, or hard and rolled on the back, are sure to give defective and objectionable carcasses, even though they are thick, and they also cut up with correspondingly greater waste.

A marked and important change has taken place in the profitable type of cattle within comparatively recent years. This change is strikingly illustrated in the development of the Shorthorn. By the courtesy of that veteran feeder and most excellent authority on live stock, the late William Watson, I am permitted to furnish a good illustration (fig. 8) of the popular type of beef animal about the beginning of the present century. At that time Culley said, in one of his contributions on live stock, that the "unimproved" breeds of Teesdale were a "disagreeable kind of cattle, that, though fed ever so long, never produced any fat, either within or without." Youatt, another celebrated author, described them as "generally of great size, thin-skinned, sleek-haired, bad in handling, coarse in offal, and of delicate constitution." With this as a foundation stock, it is not so difficult to understand how an animal of the Newbus ox stamp might be classed as belonging to the improved order. This ox was sired by a grandson of Charles Colling's celebrated bull "Old Favourite," and the dam was supposed to be a Scotch Highland cow. The early Shorthorns were large and massive. The famous Durham ox weighed nearly 3,800 pounds when 10 years old. The demand for early maturity and plump, sappy carcasses of medium weight and minimum offal and waste had not then set in. It was not until within recent years that the heavy, inordinately fat, or rough and patchy bullock, became unpopular to such an extent as practically to drive this class from the market and

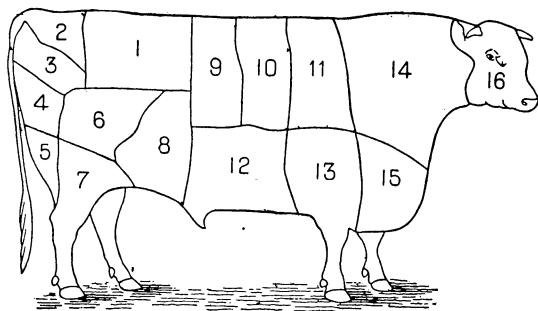


FIG. 7.—English method of cutting beef.

to banish the type from the breeding herds. It is well that this was done, for the modern type, represented by the first three illustrations, makes beef at decidedly more profit and economy to both the producer and the butcher and furnishes the consumer a far superior article.

The parts furnishing the high-priced cuts must be thickly and evenly covered with firm yet mellow flesh of uniform good quality and alike free from hard rolls and blubbery patches. Coarse, harsh, and gaudy animals will no longer be tolerated, much less those that are bony and bare of flesh on the back and ribs. The men who buy our cattle and fix their market value are shrewd enough to know almost at a glance how much and just what kind of meat a steer or carload of steers will cut out, and if the producer overlooks any of the essential points he is compelled to bear the loss.

Then, in addition to securing the general beef form and make-up,

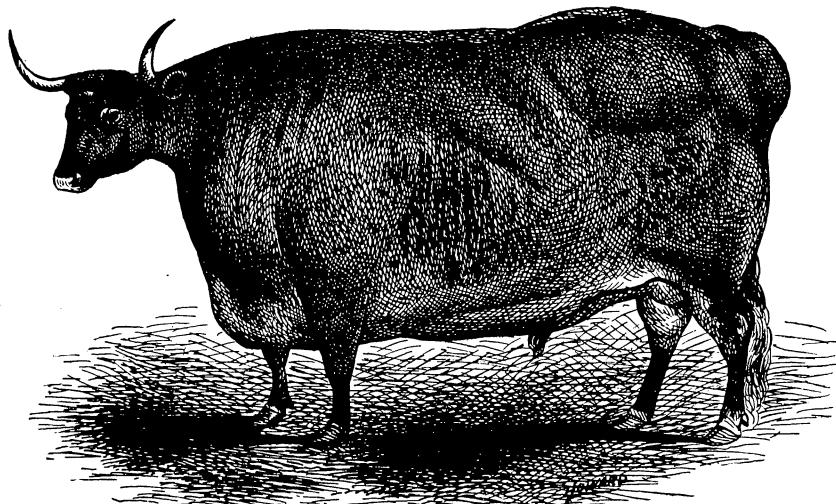


FIG. 8.—Newbus ox.

together with good backs, ribs, and loins, there is a certain quality, character, style, and finish that constitute an important factor in determining the value of beef cattle. One of the first indications of this is to be found in the skin and coat. A good feeding animal should have a soft, mellow touch and a soft but thick and heavy coat. A harsh, unyielding skin is an indication of a sluggish circulation and low digestive powers. The character and finish exemplified by a clear, prominent yet placid eye, clean-cut features, fine horn, and clean, firm bone, all go to indicate good feeding quality and a capacity to take on a finish of the highest excellence, and consequently to command top prices. Coarse boned, rough animals are almost invariably slow feeders and hard to finish properly. A certain amount of size is necessary, but it should be obtained without coarseness. The present demand exacts quality and finish rather than size.

Besides these qualities, and above all, it is necessary to have vigor and constitution. We find evidence of these in a wide forehead, a prominent brisket, broad chest, well-sprung ribs, full heart girth, and general robust appearance; and without these, other excellence will not have its highest significance.

#### SELECTION OF STORE, OR STOCK, CATTLE FOR FEEDING.

Practical and experienced feeders who breed or purchase steers for fattening observe striking differences in the aptitude of animals of

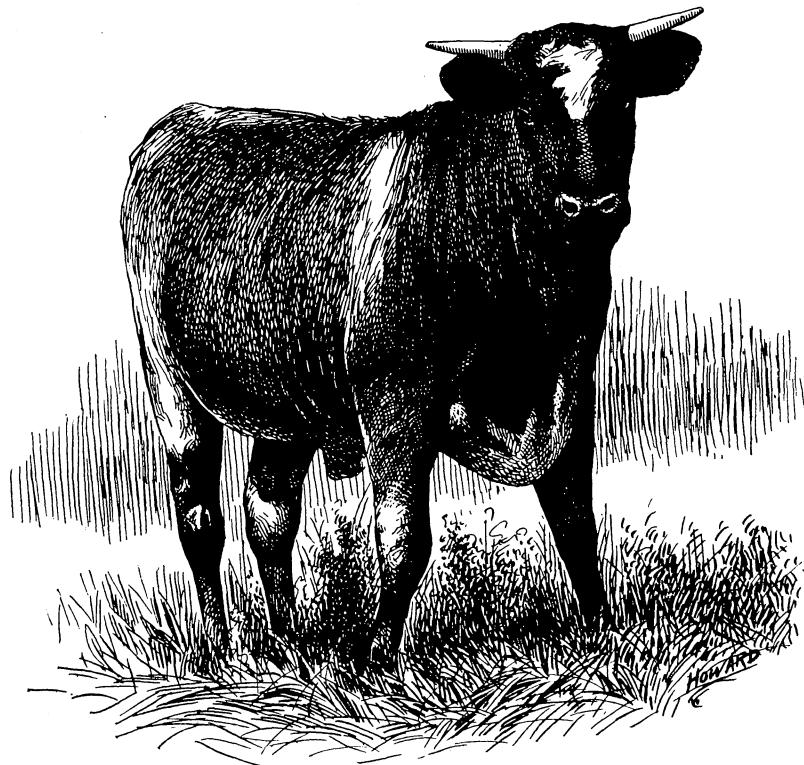


FIG. 9.—A good head and front.

varying types and make-up to lay on flesh readily and in such form and quality as to command the highest price on the market. It requires a well-trained eye to detect in all cases the possible variation of results in the store, or stock, steer; but there are some distinctions that are easily detected. There are certain types of cattle, for instance, that never feed profitably under any conditions, and it is quite as important to discriminate against these in the feed lot as to be able to recognize the excellence in other types. The accompanying illustration (fig. 9) represents a yearling steer that combines practically all of the qualities that go to make up a good feeding steer, while figures 11 and 12

represent the opposite type. The latter are illustrations of dairy bred steers, but there is equally as good reason for discarding any native or unimproved steer that presents a similar angular outline, spare form, and rough exterior. The dairy breeds illustrated here are eminently adapted to the purpose of special dairying, but it is a mistake and

positive evil to claim for them any beef excellence whatever, as the kind of beef they are capable of producing will almost invariably cost the producer more than its value on the market.

The characteristics that make the profitable feeder are naturally more difficult to detect in animals in stock condition than when fattened, but notwithstanding this there are a number of indications that are fairly reliable. Though the young steer may be comparatively thin in flesh and temporarily lacking the thick, even covering of the back and ribs so essential in the finished carcass, he must nevertheless

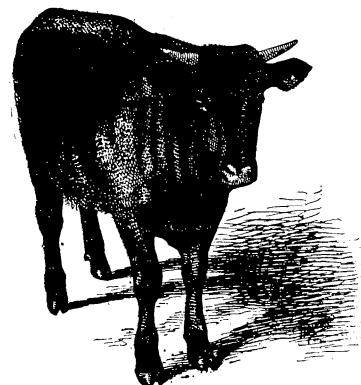


FIG. 10.—A good feeder in stock condition—front view.

present that blocky frame and stoutness of build, accompanied by short, straight legs, wide back and loin, well-sprung ribs, fullness back of shoulders and in flanks, prominent brisket, full neck vein, wide chest, and well-rounded barrel, together with a good, soft, mellow handling skin and fine, silky hair, giving what is termed the thick, mossy coat, without coarseness, and with it all a good, strong, vigorous head, clear, full eye, and quiet temperament. The importance of an even covering of flesh and good handling quality can hardly be overestimated. The bone should be moderately fine and clean. Coarseness either in the bone or about the head and horns is particularly objectionable, as it indicates coarseness of texture throughout and a greater percentage of offal and cheap meat, as well as a tendency to sluggish circulation. The head should present a certain refinement, finish, and vigor that in a measure indicate general quality and superior excellence of finished product, though this refinement must not be accompanied

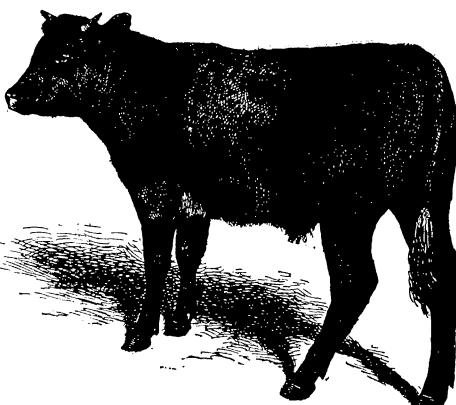


FIG. 10a.—A good feeder in stock condition—rear view.

by delicacy. The illustrations (figs. 10 and 10a) of a good feeding type in stock condition are taken from photographs of one of a carload of skim-milk calves in a feeding experiment at the Iowa Experiment Station.<sup>1</sup> This calf was about a year old when these photographs were taken. This picture furnishes a good illustration of the type that never fails to make a good record in the feed lot and on the block. While it perhaps represents a higher standard of excellence than can generally be obtained in feeding cattle, the standard is none too high for the best results, and it should be as closely approximated as practicable.

#### BREEDING TYPE VERSUS THE BLOCK.

Notwithstanding the importance of those things which go to make up a finished carcass of beef of the highest value, and while the block is the ultimate end of all beef cattle, it should be kept in mind that undeveloped breeding stock can not at all times be expected to measure up to this standard. Every fair or live-stock exhibition should have its fat-stock classes, and these should be taken as the standard of the finished product. They will afford the most practical and useful lessons to be gained by the show, and the stock brought out for them will represent the culmination of the highest excellence that can be attained. The competition will be a measure of everything at its best, and in it every animal will rightly be rated according to what it is capable of producing on the block. The show ring should afford a contest of that kind, and in addition to the practical lessons and its educational value it would at least partially remedy the tendency to rate breeding stock according to the flesh carried. While heavy flesh is necessarily a factor of great importance, yet to go into a breeding herd and absolutely rate every animal as if it were to go at once to the shambles may lead to entirely erroneous results. Fitting should not be undervalued. Other things being equal, the best fitted should always win; but an animal in a breeding herd ought to be rated according to its value as a representative of that herd, and for the purpose of the herd, instead of taking rank simply as a carcass of beef in the form presented. Breeding and feeding quality should not be subordinated to mere wealth of flesh. In a fat-stock ring it is proper that only the carcass be considered. In a breeding ring an animal should be rated by its value to go on in the herd and not simply to go onto the block. There is a well-marked distinction here that should never be overlooked. The fat-stock classes should be added to stock-show classifications for the lessons they will bring and to avoid diverting the purpose of the breeding-stock classes.

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<sup>1</sup> Bulletin No. 35, Iowa Experiment Station.

**EXCELLENCE FOR THE BLOCK DUE TO INHERITED QUALITY RATHER THAN FEED OR GAIN.**

The misleading practice of rating beef animals mainly by the gains made in the feed yard is altogether too common. The distinction between cattle of different types is absolutely essential to profitable feeding. There is not a very great difference in the rate of gain, or the number of pounds of increase in weight from a given amount of feed, that will be made by a representative of the best beef breeds, or by a genuine scrub, a Jersey, or a Holstein steer. This statement may seem

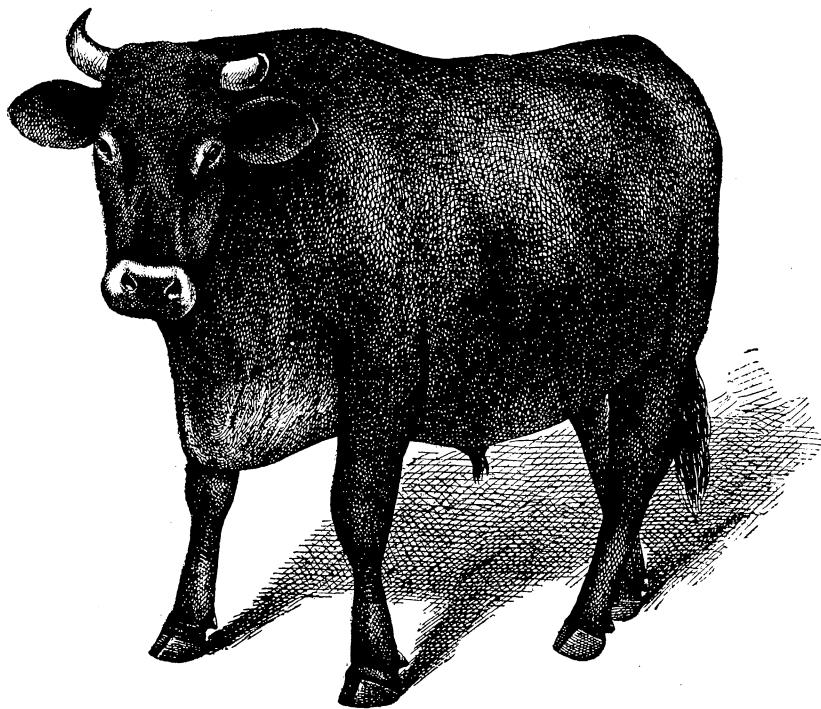


FIG. 11.—An unprofitable feeding type.

somewhat at variance with prevailing opinion concerning the potency and superiority of improved blood. Practical breeders and improvers of live stock have been rather reluctant to recognize this doctrine, and a good many will not concede it yet; but the evidence is constantly accumulating, the principle has been repeatedly demonstrated, and it is useless to ignore facts.

After all there is no well-founded reason why a Shorthorn, an Angus, or a Hereford should make more gain in weight from a bushel of corn than a native, or scrub. This is governed altogether by the digestive and assimilative machinery of the steer. The Holsteins, for instance, are well known to be hardy and extremely vigorous eaters. They consume large quantities of feed, and render good returns for their rations, and the despised scrub has a ravenous appetite, and is almost as omniv-

orous as a goat. It is not reasonable to expect that the improved breeds, notwithstanding their superiority in other respects, have inherited any greater constitutional vigor or more perfect working organs of digestion than those animals belonging to the class designated as natives, or scrubs, which, from the nature of their surroundings, and the very law of their existence, have been inured to all kinds of hardship. Nature's law of the survival of the fittest was more rigid and exacting than the selection of the average modern breeder. Why, for instance, should a Shorthorn or a Hereford steer be able to utilize a larger proportion of a given ration than a Holstein? Has not the latter been as highly improved, as carefully and as continuously bred for the express purpose of making good return for a liberal ration? Scientists have discovered that civilized man has no greater powers of digestion than the barbarian or the Indian. Neither has the improved steer materially better digestion than the native. The feeder is often deceived in the belief that he has a good bunch of cattle simply because they feed well and gain rapidly. Economy of production is an important factor, but it is by no means all. It is even more important to have a finished product that the market wants and will pay for than it is that it should simply be produced cheaply.

The illustration (fig. 11) represents a high-grade Jersey steer, fed and marketed by the Iowa Agricultural Experiment Station. This steer was fattened and finished for market under conditions quite similar to those of the Shorthorn and Hereford steers illustrated on pages 4 and 5, and the rations were practically the same.

#### THE TYPES COMPARED.

In making a comparison, only the Hereford will be used, but the distinctions are equally applicable to either. While in the feed lot, the Jersey made a gain of 2 pounds a day for nine months and the Hereford 2.03 pounds a day for fourteen months. There was practically no difference in the rate and cost of gain. Judged by the record they made up to the time they went to market, the Jersey would take rank close to the Hereford in both rate and economy of gain. But the interesting part of the comparison came later. The Jersey took on flesh rapidly, and was exceedingly fat and well finished. He was as good as it is possible to make a Jersey steer. Yet, when he went to market he had to sell \$2.12½ below the top quotations, while the Hereford was one of a carload to sell 10 cents above the top for any other cattle on the market. It is sometimes claimed that this distinction is partly due to prejudice, but since I have followed cattle through the feed lot and to market and onto the block, carefully ascertaining all the facts for several years, I am convinced that the expert buyers who fix the price for beef cattle in the great market centers rate them strictly on their merits, entirely independent of any breed or type consideration. The controlling factor is the utility and inherent value of the animal for the practical

test of the butcher. The slaughter and block test clearly revealed the reasons for this marked distinction in the selling value of these two steers.

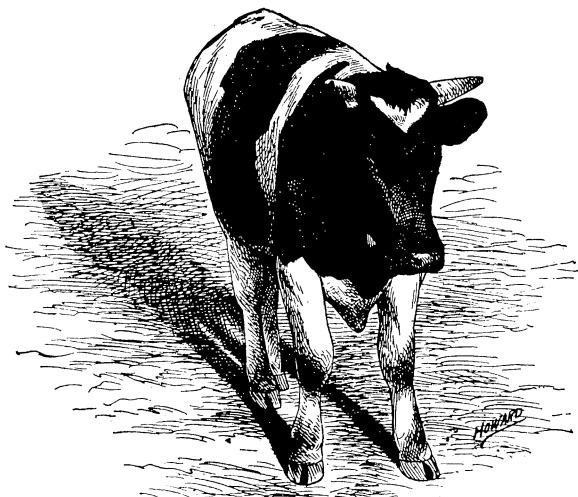


FIG. 12.—A bad back and unprofitable feeding type.

The Jersey belongs to a breed that has been developed for centuries for the specific purpose of making butter; that is, putting the product

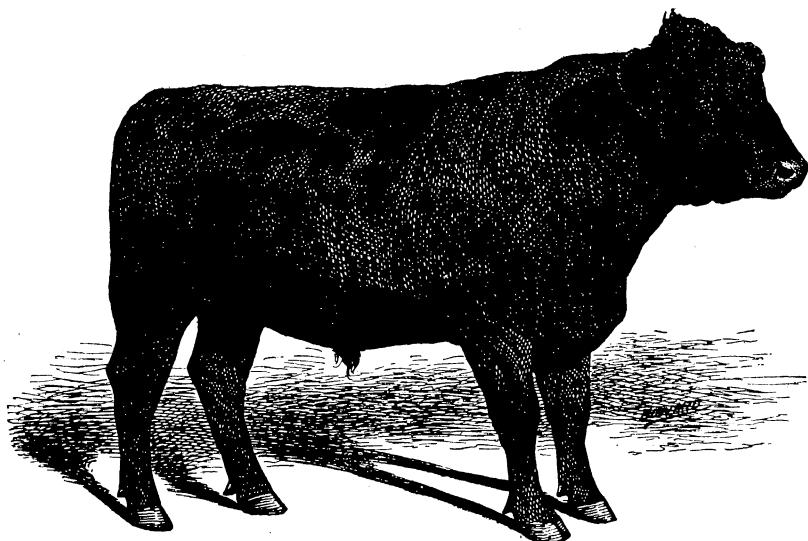


FIG. 13.—A good back.

of its feed into the milk pail. They are rough, angular, and bony, and when fattened they do not put the fat into the tissues of the high priced cuts of steak and roasts on their back, as a representative of

the beef breeds does, but this steer had 190 pounds of what is termed loose, or internal, tallow and 55 pounds of suet on a 763-pound carcass;

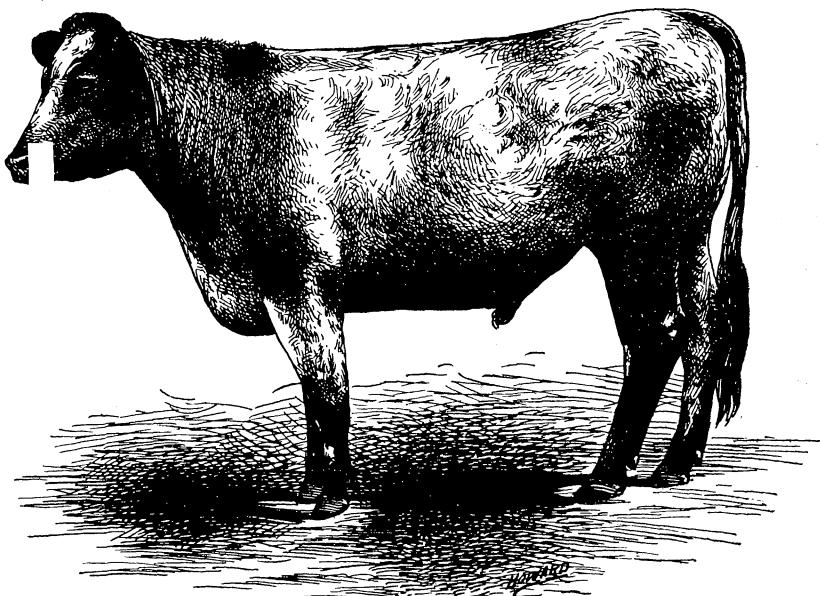


FIG. 14.—A good feeder.<sup>1</sup>

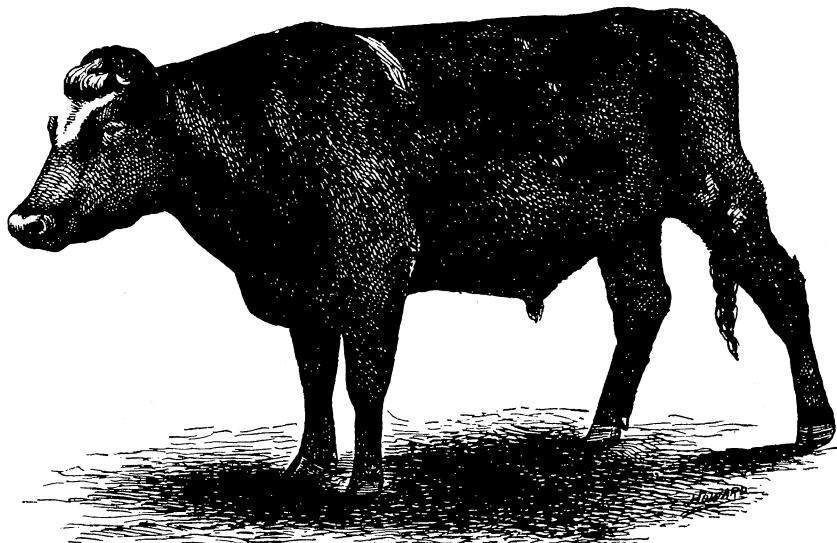


FIG. 15.—A bad feeder.<sup>1</sup>

that is 32.1 per cent of the steer's carcass was tallow. Tallow was at that time worth 4 cents a pound, while the best loin cuts were worth 19

<sup>1</sup>Both pure-bred Shorthorns fed at the Kansas Experiment Station. Bulletin 51, 1895.  
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cents at wholesale. And besides that, this steer only dressed 57.5 per cent of beef, while the Hereford dressed 67.5 per cent. Then, the Hereford had only 95 pounds of tallow and 38 pounds of suet on an 888-pound carcass, equivalent to 15 per cent. And besides this striking difference in the percentage of meat in the high-priced cuts, the meat of the Jersey was much inferior to that of the Hereford. The Jersey steer went on accumulating fat around his paunch and internal organs to the extent of nearly one-third of his entire body weight, while he did not have meat enough on his back to decently cover his bones. This explains why a Jersey or a Holstein or any other animal not expressly bred for beef can never be made plump and smooth, no matter how long it is fed or how highly it may be fattened.

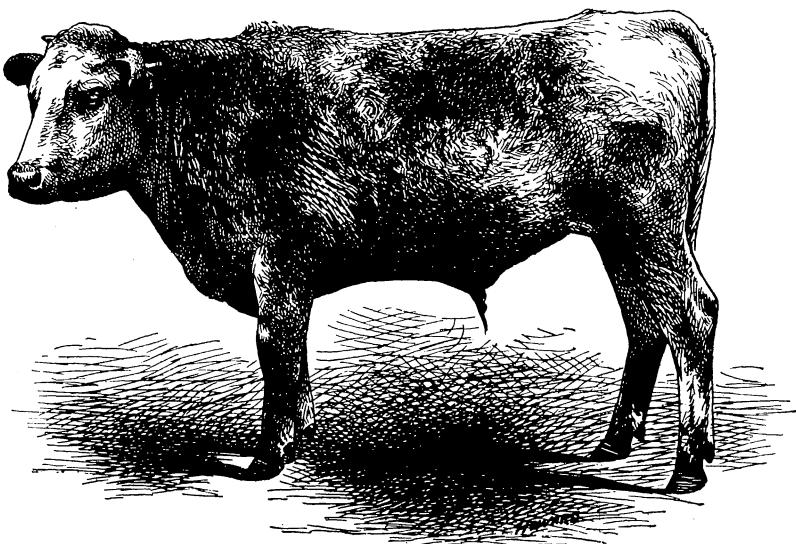


FIG. 16.—A bad feeder.<sup>1</sup>

The two illustrations (figs. 11 and 12) on pages 15 and 16 present additional evidence of this essential in the profitable beef type.

One of the steers shown is a pure-bred Holstein and the other a pure-bred Galloway. At the time the photographs were taken both had been on feed at the Iowa Agricultural Experiment Station under uniform conditions for six months. The gains made were substantially the same, and the feed eaten varied scarcely any. At this writing these steers have not been marketed, but stock shippers bid \$5 per ewt. for the Galloway while the best offer for the Holstein is \$3.50. The back of the Holstein steer affords an object lesson for the feeder. It presents a model of about all that is not wanted. Its deficiencies are strikingly apparent, and, what is more, a back of that kind never takes on a smooth covering of good flesh under any amount of good

<sup>1</sup> Scrub fed at the Kansas Experiment Station. Bulletin 51, 1895.

feeding. Besides, the scanty flesh that is there will be found of inferior quality owing to the absence of that fat deposited throughout the tissues of the meat that is necessary to a ripe, juicy, and highly flavored cut. There is a fundamental and essential reason why rough cattle do not sell. These same distinctions are largely true of the native and all other unimproved cattle when an attempt is made to fatten them for beef. The men who buy them are well aware of these distinctions and they fix their market values accordingly.

It is of vital importance, then, that the feeder should have the right kind of cattle for fattening. The Jersey and the Hereford steers previously referred to made practically the same gains in the feed lot and

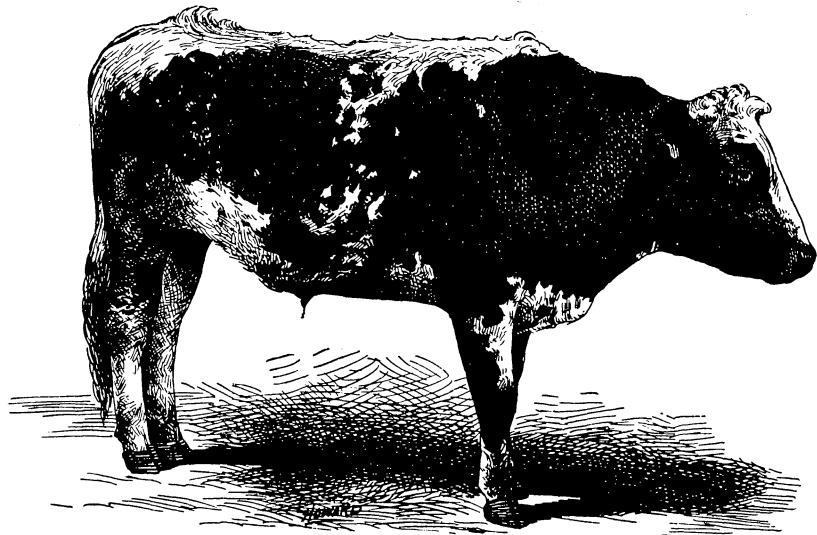


FIG. 17.—A bad feeder.<sup>1</sup>

at substantially the same cost per pound for feed consumed, but the market comparison revealed the fact that the steer of beef type and inherited beef-making capacity was making a product worth 49 per cent more than the other steer, and this increased value not only applied to the gain made in the feed yard, but to the entire carcass as well. The feeder can not afford to ignore these distinctions. They are of vital concern and determine profit or loss. If the producer were hauling his corn or other products to market instead of feeding it to cattle, he would not hesitate to select one that would return 49, or 25, or even 10 per cent more than another. The loss can not be afforded in either way.

#### EARLY MATURITY.

Another consideration having a practical bearing on the meat-producing industry is the economy of production as influenced by the age

<sup>1</sup> Scrub fed at the Kansas Experiment Station. Bulletin 51, 1895.

of the animal. It is but a few years since the prevailing practice among cattle raisers and feeders was to allow the steer the first three years of its existence in which to attain the standard growth, and supplement this by six months on a heavy grain ration for the fattening process. The two periods were regarded as essentially distinct, and it was firmly believed that they must always remain so. Under these conditions it was also observed that as the fattening process advanced the gains invariably diminished. The last hundred pounds produced on a bullock not infrequently cost per pound three times the live-weight value per pound of the animal on the market. This was the day of heavy weights and they had to be produced at all hazards and regardless of expense. In January, 1893, the Iowa Agricultural Experiment Station marketed cattle at 1,500 pounds that were rated 37½ cents per cwt. below 1,700-pound cattle of the same quality. The buyers stated that they were equally as good in every respect except that they lacked the size required to furnish the cuts demanded by the trade.

#### THE PASSING OF THE HEAVY-WEIGHT CARCASS.

A marked change has taken place within more recent years, however. These years have witnessed the passing of the large, overfattened steer and the supremacy of the well-fattened, medium-weight carcass yielding better returns in the feed lot and more profit on the block, and it is probable that the old sort heavy weights will never again outsell the compact tidy bullock of prime quality and medium scale.

The existence of these conditions adds a new interest and practical significance to the question of early maturity. The new order of things has placed the advantages and economy to be derived from this source within the reach of the feeder, whereas their attainment was formerly impracticable.

In this connection the following editorial, appearing in the Live Stock Report, April 23, 1897, is particularly applicable:

There seems to be a wide diversity of opinion as to what constitutes a "heavy steer." \* \* \* One man thinks 1,800 pounds not too heavy for even a June market, while another is fearful that his 1,300-pound cattle, unless shipped at once, will be too heavy, and have to go at sacrifice figures. Every feeder should keep in touch with his market, watching that market's fluctuations, noting its preferences, and then cater to its demands. It is not always quality that insures a good sale, it is very frequently judicious feeding and shipping. The most successful feeder is the one who, starting with the right class of stock as regards quality and condition, aims to finish them at a time when that particular class is in best demand at market. This can not always be figured down to a nicety, but it can be pretty closely approximated. Feeders who get their cattle in at the most advantageous time are termed "lucky," but "brainy" would be a more appropriate term.

At this time last year large numbers of excessively fat beeves were being put upon the market, and this condition of affairs continued throughout April and May and on into June. They sold at a fearful sacrifice, and why? Because they were heavier than any demand called for. \* \* \* This winter and spring we have had an exactly opposite condition of affairs. The tendency has all been toward early

shipping, and daily and weekly the market has had an oversupply of half-fat cattle. The proportion of 1,400 to 1,500 pound beeves has been remarkably small, and yet this has been throughout the entire season the very best selling class, owing to the excellent export demand and a good inquiry from eastern buyers as well. \* \* \* There has been no inquiry for cattle weighing over 1,600 pounds. The day of such animals seem past and gone forever. But we have hardly had enough beeves weighing between 1,400 and 1,600 pounds to fill requirements, and feeders who have heeded our advice and fattened their cattle to within those weights have assuredly made money. Those are "heavy" steers. Over the above weight steers become excessively fat, and buyers discriminate. There is now no demand for cattle weighing over 1,600 pounds, and in fact buyers at the yards say 1,500 pounds is heavy enough for any purpose. There are practically two months, though, when even 1,400 pounds is a little too heavy, and this period is now approaching—May and June. During this time a 1,350-pound steer is heavy enough for any purpose—home slaughter, eastern shipment, or export alive. Throughout the other ten months of the year cattle weighing upward of 1,400 pounds and not over 1,500 are the most desirable class to handle. The lighter weights are the first and best sellers on the British markets during warm weather, and for this reason exporters want that class here, say, between May 15 and July 10. And every shipper to market knows that when exporters are not buying heavy cattle those beeves suffer badly. \* \* \* The feeder should know what his market wants, and when it wants it. The feeder must cater to the market; the market will not cater to the feeder; it is too busy catering to public demand.

It is a well-established principle in animal nutrition that young animals make more economical gains than older ones, and that the amount of feed required for a given gain increases as the age of the animal advances toward maturity.

#### THE ECONOMY OF GAIN AT DIFFERENT AGES COMPARED.

Comparatively few practical feeders are aware of the marked variation due to the operation of this law. Experiments are recorded where gain has been made at the rate of 1 pound of increase in live weight for each pound of dry matter in the feed consumed.<sup>1</sup> This was made with calves under three weeks of age. The ration consisted of 17.6 pounds of milk per head daily with 3.9 pounds of cream added.

In an experiment conducted by the writer at the Iowa Agricultural Experiment Station<sup>2</sup> a gain of 1 pound of increase in live weight was obtained from each 1.97 pounds of dry matter in the feed consumed. This experiment covered a period of ninety days, beginning when the calves were about one week old. The ration consisted of separator skim milk, supplemented with corn, oats, and oil meal, and in addition a moderate allowance of hay. For the first eight months it required 4.6 pounds of feed (dry matter) for a pound of gain, and for the first seventeen months it required 5.97 pounds of feed for a pound of gain, and for a period of two years the amount of feed required for a pound of gain had increased to 7.19 pounds, and during the last four months the amount of feed per pound of gain ran up to 9.02 pounds. In

<sup>1</sup> Armsby's Manual of Cattle Feeding.

<sup>2</sup> Bulletin No. 25, p. 24, Iowa Experiment Station.

another experiment, recorded in Bulletin No. 24 of the Iowa Station, five steers were finished for market at the age of 32 months, and it required 10.4 pounds of feed for a pound of gain at this age. Director Thorne and Professor Hickman have presented a summary of results<sup>1</sup> obtained at the stations in eight States, covering 132 head of cattle ranging in age from 2 to 3 years, in which it is shown that it has required on an average 10.24 pounds of feed (dry matter) for a pound of gain, while the work done by Lawes and Gilbert along this line indicates an average of about 11 pounds of feed per pound of gain on cattle approaching maturity.

These results have been repeatedly verified by many other careful experiments, not only with cattle, but with sheep and hogs as well, and the law of diminishing returns for feed consumed as animals advance in age toward maturity is conclusively established, and governs the economy of gain in all practical as well as experimental feeding. This law should be kept constantly in mind by the meat producer. Economy of production is one of the important factors in the practical problem of determining profit, and the advantages are all with the young and growing animal as compared to the one that has practically attained its growth. In comparing the cost of gain made by pure-bred Shropshire lambs and pure-bred Shropshire yearlings at the Iowa Agricultural Experiment Station, it was found that the lambs made gain in weight at the rate of 1 pound from each 7.18 pounds of feed<sup>2</sup> consumed, at a cost of 2.88 cents per pound for the gain made, while it required 11 pounds of feed to make a pound of gain on the yearlings, and at a cost of 4 cents. All conditions except age were the same.

The market also pays a premium on the younger animal, owing to the fact that it furnishes a more profitable carcass and less waste by reason of the absence of excessive fat.

The policy of the feeder should be to make use of the advantages of early maturity so far as practicable and consistent with existing conditions. It is not in all cases practicable to do so, however, except in a moderate degree. Forcing to an early finish necessarily means more expensive feeding than where longer time is taken, and more use is made of cheaper coarse feeds. Where lands are cheap and grazing and coarse fodders abundant, it may even yet be desirable to take more time for finishing animals for the block and thereby secure greater weight with the minimum amount of grain. In the great feeding section within what is known as the "corn belt," however, the conditions are such as to favor the liberal policy of feeding from first to last, and under these conditions early maturity may be attained by a generous use of the ordinary feeding stuffs throughout the entire growing and fattening period, quite as well or even better than by too extensive use

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<sup>1</sup> Bulletin No. 60, Ohio Station.

<sup>2</sup> Bulletin 33, pp. 536 and 565.

of the more concentrated and expensive grain feeds. That is to say, early maturity may be largely accomplished by the liberal use of the cheaper feeds of the farm, combined with a suitable grain ration, which may be quite moderate except in the finishing period. The modern feeder must combine the advantages of economy of production resulting from early maturity, and the excellence and enhanced value of the finished product that can only come from the right kind of stock well handled. This implies good breeding and continuous good feeding. These requirements are no longer merely subservient, but practically imperative.

## FARMERS' BULLETINS.

These bulletins are sent free of charge to any address upon application to the Secretary of Agriculture, Washington, D. C.

[Only the bulletins named below are available for distribution.]

- No. 15. Some Destructive Potato Diseases: What They Are and How to Prevent Them. Pp. 8.
- No. 16. Leguminous Plants for Green Manuring and for Feeding. Pp. 24.
- No. 18. Forage Plants for the South. Pp. 30.
- No. 19. Important Insecticides: Directions for Their Preparation and Use. Pp. 20.
- No. 20. Washed Soils: How to Prevent and Reclaim Them. Pp. 22.
- No. 21. Barnyard Manure. Pp. 32.
- No. 22. Feeding Farm Animals. Pp. 32.
- No. 23. Foods: Nutritive Value and Cost. Pp. 32.
- No. 24. Hog Cholera and Swine Plague. Pp. 16.
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- No. 56. Experiment Station Work—I. Pp. 30.
- No. 57. Butter Making on the Farm. Pp. 15.
- No. 58. The Soy Bean as a Forage Crop. Pp. 24.
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- No. 67. Forestry for Farmers. Pp. 48.
- No. 68. The Black Rot of the Cabbage. Pp. 22.
- No. 69. Experiment Station Work—III. Pp. 32.
- No. 70. The Principal Insect Enemies of the Grape. Pp. 22.